Gefen

4x4 HDMI Matrix
USER MANUAL

www.gefen.com

ASKING FOR ASSISTANCE

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INTRODUCTION

Thank you for purchasing the 4x4 HDMI Matrix.

The 4x4 HDMI Matrix switches four HDTV sources to any four HDMI displays.

The 4x4 HDMI Matrix switcher has four HDMI inputs and four HDMI outputs. Matrix input #1 and the HDMI port of HDTV source #1 connects using a male to male HDMI cable. The HDMI port of HDTV source #2 connects to HDMI input #2. The HDMI port of HDTV source #3 connects to HDMI input #3. The HDMI port of HDTV source #4 connects to HDMI input #4. There are four (4) HDMI outputs connecting to four (4) different displays.

Note: The switching is done by using either the RMT-16-IR remote control or through the RS232 port. The 4x4 HDMI Matrix is rack mountable. Any HDTV with DVI inputs can be connected to the HDMI outputs of the matrix by using a DVI to HDMI adapter if the cable used is DVI.

OPERATION NOTES

READ THESE NOTES BEFORE INSTALLING
OR OPERATING THE 4X4 HDMI MATRIX

• You should connect all the cables and power supply prior to connecting power to the HDTV sources and 4x4 HDMI Matrix.

• When powering the sources, the display needs to point to the source input.

• The 4x4 HDMI Matrix is housed in a metal box for better RF shielding.

• The 4x4 HDMI Matrix works with all DVI and HDMI displays.

• The 4x4 HDMI Matrix supports both AUDIO and VIDEO signals.

• The 4x4 HDMI Matrix is fully HDCP compliant.

Features

• Allows any HDMI display to view any source at any time

• Allows any source to be displayed on multiple displays at the same time

• Maintains resolutions up to 1080p, 2K, and 1920x1200

• Maintains highest HDMI single link video resolution

• Maintains highest HDMI digital audio signal

• Supports HDCP compliant devices

• HDMI or DVI to HDMI cables are used to connect the inputs and the matrix output

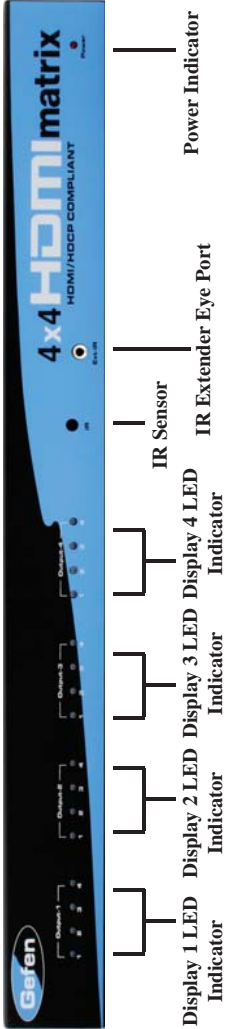• Each display's inputs can be switched with the IR remote control or through RS232

 Includes:

(1) 4x4 HDMI Matrix
(4) HDMI 6 Cables (M-M)
(1) 24VDC Power Supply
(1) User Manual
(1) RMT-16IR Remote Control
(1) Rack Ears

Front Panel

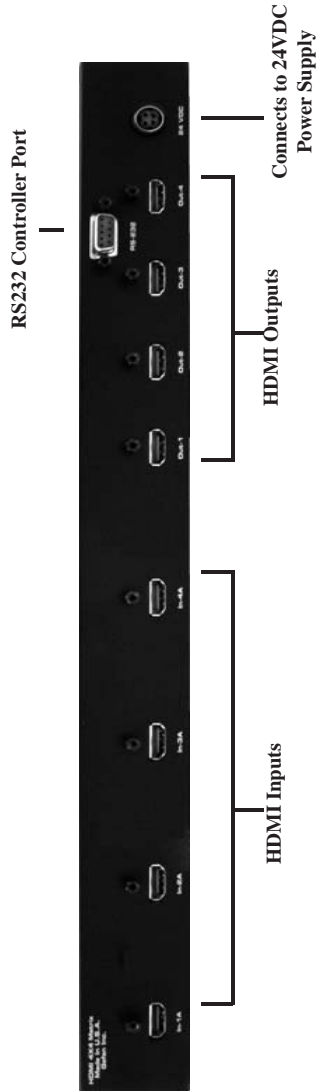Power Indicator

IR Extender Eye Port

IR Sensor

Display 4 LED Indicator

Display 3 LED Indicator

Display 2 LED Indicator

Display 1 LED Indicator

Back Panel

Connects to 24VDC Power Supply

RS232 Controller Port

HDMI Outputs

HDMI Inputs

3

USING THE 4X4 HDMI MATRIX

1 Connect all the sources to the HDMI inputs on the 4x4 HDMI Matrix, using the supplied cables.

2 Connect the HDMI/DVI displays to the outputs on the 4x4 HDMI Matrix.

3 Connect the 24VDC power supply to the 4x4 HDMI Matrix

4 Controlling the 4x4 HDMI Matrix using the RMT16-IR:

Pressing Buttons...	Switches...
1-4	Display 1 to view Source 1, 2, 3, or 4
5-8	Display 2 to view Source 1, 2, 3, or 4
9-12	Display 3 to view Source 1, 2, 3, or 4
13-16	Display 4 to view Source 1, 2, 3, or 4

RMT16-IR INSTALLATION

1. Remove battery cover from the back of the RMT16-IR remote.

2. Verify that dip switches 1 & 2 are in the down (OFF) position.

3. Insert the battery, hold the battery so that you can see the positive side facing up. The side that is not marked must be facing down.

4. Test the RMT16-IR remote by pressing ONLY one button at a time. The indicator light on the remote will flash once each time you press a button. WARNING: Do not press multiple buttons simultaneously and do NOT press buttons rapidly. These actions will cause the remote to reset and steps 1-4 will have to be repeated.

Note: The RMT16-IR ships with two batteries. One battery is required for operation, the second battery is complimentary.

IR CODE CONFIGURATION

Why would I need to change the remote channel?

In some instances, the 4x4 Matrix for HDMI may use IR codes that conflict with other IR remote control devices. The unit may switch inputs when another brand IR remote control is used or the RMT16-IR may cause other brand IR controlled devices to behave unexpectedly.
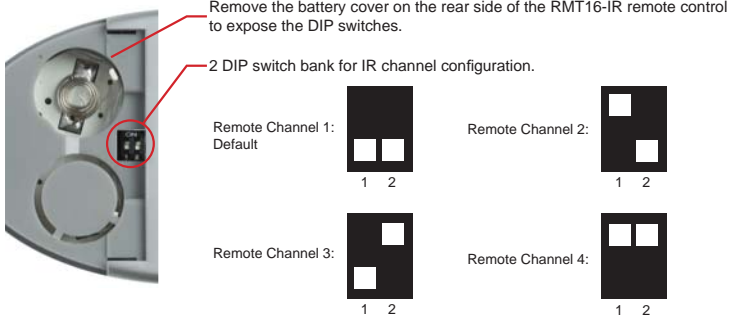
I am experiencing the issues listed above. What do I do?

In these cases it is recommended to change the IR channel that the RMT16-IR remote control and the 4x4 Matrix for HDMI use. The IR channel is configured independently on the RMT16-IR remote control and the 4x4 Matrix for HDMI but the channel selection must match on both units for proper operation.
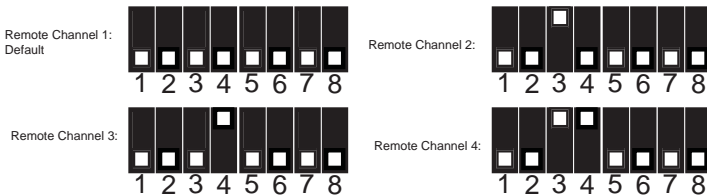
How Do I change the Remote Channel?

There are service DIP switches on the RMT16-IR remote control and also inside the 4x4 Matrix for HDMI. Use the diagrams below to locate and change the IR channel to one that is not the default. Remember that the channel must match on both the unit and remote control for successful operation.

RMT16-IR Remote Control

Remove the battery cover on the rear side of the RMT16-IR remote control to expose the DIP switches.

2 DIP switch bank for IR channel configuration.

Remote Channel 1: Default

1 2

Remote Channel 2:

1 2

Remote Channel 3:

1 2

Remote Channel 4:

1 2

4x4 Matrix for HDMI

The IR channel DIP switches for the 4x4 Matrix for HDMI are located on an 8 bank DIP switch inside of the unit and on its main-board. To open the unit, remove all screws on the underside and side of the unit. Remove all HEX screws on the rear panel. This includes the screws above each HDMI port and on each side of the RS-232 serial communications port. Carefully slide the unit apart. Locate DIP switches 3 and 4. Once adjustments are complete replace all screws and.

Remote Channel 1: Default

1 2 3 4 5 6 7 8

Remote Channel 2:

1 2 3 4 5 6 7 8

Remote Channel 3:

1 2 3 4 5 6 7 8

Remote Channel 4:

1 2 3 4 5 6 7 8

EDID MANAGEMENT FEATURE

EDID. What is it and what is it used for?

Under normal circumstances, an source device (digital and analog) will require information about a connected device/display to assess what resolutions and features are available. The source can then cater its output to send only resolutions and features that are compatible with the attached device/display. This information is called EDID (Extended Display Information Data) and a source device can only accept and read one EDID from a connected device/display. Likewise, the source an only output one resolution for use by a connected device/display.

Why is EDID so important with the 4x4 Matrix for HDMI?

The 4x4 Matrix for HDMI is complex piece of technology that replicates and switches between multiple inputs and outputs. Each connected source device will require one EDID to read. EDID management is carefully handled by 4x4 Matrix for HDMI to provide a single EDID for each source to read.

What options do I have to manage the EDID in the 4x4 Matrix for HDMI?

First, it is important to note that each source device can only output one video/audio signal type. This includes resolutions and timings. When multiple devices/displays are used, such as with the 4x4 Matrix for HDMI, it is important to use devices/displays that have similar or compatible resolutions/features. This will ensure that the single video/audio signal produced by the source device is accepted by all of the connected output devices/displays.

The user has the option, through a combination of DIP switch settings within the 4x4 Matrix for HDMI, to choose how the unit will manage the EDID from multiple HDMI devices/displays. Therefore the user has some control over the resolutions/features that the source devices will output. The 4x4 Matrix for HDMI has a multiple EDID management modes that will control how the EDID information from multiple devices/displays are combined, ignored, and routed.

How do I change EDID modes in the 4x4 Matrix for HDMI?

There is an bank of 8 DIP switches located on the main-baord inside of the 4x4 Matrix for HDMI. DIP switches 1, 2, 5, and 7 are used in different combinations to manage the EDID modes.

TIP: EDID modes and IR code channels can also be managed via the RS-232 serial communications port. For this to work, all DIP switches must be in the OFF position. This is the factory default setting. If you wish to use this feature, please do not open the unit. See page 9 and 10 for more information on the RS-232 serial communication features.

To access these DIP switches it will be required to open the unit. To do this, remove all screws on the underside and side of the unit. Remove all HEX screws on the rear panel. This includes the screws above each HDMI port and on each side of the RS-232 serial communications port. Carefully slide the unit apart.

EDID Modes

The diagram below illustrates the 8 DIP switch bank.
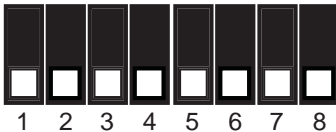
DIP SWITCH	Function
1	EDID Mode
2	EDID Mode
3	IR Channel
4	IR Channel
5	EDID Mode
6	N/A
7	EDID Mode
8	N/A

Use DIP switches 1, 2, 5, and 7 to select the desired EDID management mode.

EDID Mode 0 (Switch 1=OFF Switch2=OFF Switch5=ON)
- EDID is copied from the device connected to the first active hdmi output port.
- All features newer that HDMI 1.2 are cleared.

EDID Mode 1 (Switch 1=ON Switch2=OFF Switch5=ON)
- Same as Mode 0 and adds basic audio support.

EDID Mode 2 (Switch 1=OFF Switch2=ON Switch5=ON)
- Same as Mode 0 and adds full audio support.

EDID Mode 3 (Switch 1=ON Switch2=ON Switch5=OFF)
- EDID is generated based on the common video and audio features of all of the connected output devices.

EDID Mode 4 (Switch 1=OFF Switch2=ON Switch5=OFF)
- Same as Mode 3 and adds basic audio support.

EDID Mode 5 (Switch 1=ON Switch2=OFF Switch5=OFF)
- Same as Mode 3 and adds full audio support.

EDID Mode 6 (Switch 1=OFF Switch2=OFF Switch5=OFF) DEFAULT
- EDID is generated based on the common video features of all of the connected devices and the combined audio features of all of the connected output devices.

EDID Mode 7 (Switch 1=ON Switch2=ON Switch5=ON)
- EDID is passed unmodified from the device connected to the first active output port.

EDID Mode 8 (Switch 1=OFF Switch2=OFF Switch5=OFF Switch7=ON)
- Preloaded generic 1080p EDID is used.

EDID Mode A (Switch 1=OFF Switch2=ON Switch5=OFF Switch7=ON)
- Same as mode 6 but will record and store the EDID in memory. This EDID will persist no matter what displays are disconnected or reconnected thereafter. EDID will remain even upon power cycle. A user submitted EDID can be uploaded in this mode using a Gefen HDMI Signal Generator.

RS-232 SERIAL COMMUNICATION

What features are available via the RS-232 serial communications port?

The 4x4 Matrix for HDMI can accept commands through the RS-232 serial communications port located on the rear panel. The current RS-232 control features are:

• Switching/routing of inputs to outputs without the RMT16-IR remote control.

• Switch EDID management modes without opening the unit to physically modify DIP switches.

• Change IR code channel without opening the unit to physically modify DIP switches. (The IR code channel will still need to be manually modified on the RMT16-IR remote control to match the code channel.)

How do I use these features?

These features were initially intended for utilization by custom installers in automated setups. However, these features can be tested by using any Windows PC with the Hyperterminal program.

What pins are used for communication with the 4x4 Matrix for HDMI?

Only pins 2 (Receive), 3 (Transmit), and 5 (Ground) are used for communication. A null-modem adapter should not be used with this product.
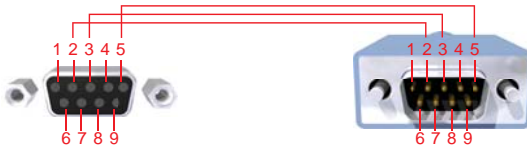
Only Pins 2 (RX), 3 (TX), and 5 (Ground) are used on the RS-232 serial interface

What are the communication port settings?

Bits per second 19200

Data bits 8

Parity .... None

Stop bits 1

Flow Control .... None

RS-232 SERIAL COMMUNICATION COMMANDS

Switching/Routing Binary Table

ASCII	RMT16-IR Button	Binary	ASCII	RMT16-IR Button	Binary
1	1	0011 0001	9	9	0011 1001
2	2	0011 0010	a	10	0110 0001
3	3	0011 0011	b	11	0110 0010
4	4	0011 0100	c	12	0110 0011
5	5	0011 0101	d	13	0110 0100
6	6	0011 0110	e	14	0110 0101
7	7	0011 0111	f	15	0110 0110
8	8	0011 1000	g	16	0110 0111

EDID Management Modes

All DIP switches inside the unit must be in their default OFF position. Use the ASCII commands below to change the EDID modes. For a description of each mode please see page 6.

ASCII	EDID Mode
m0	0
m1	1
m2	2
m3	3
m4	4
m5	5
m6	6
m7	7
m8	8
mA	A

IR Remote Channel Configuration

All DIP switches inside the unit must be in their default OFF position. Use the ASCII commands below to change the IR code channel. Please ensure that the IR remote channel on the RMT-16IR matches any channel that is set by these commands. For a description of the IR code channel configuration please see page 8.

ASCII	Remote Channel
r1	1
r2	2
r3	3
r4	4

4x4 HDMI MATRIX RACK MOUNT DIAGRAM

Rack mount ears are provided for installation of this unit into a 1U rack mount space.

1. Locate the side screws on the unit.
2. Remove the front 2 screws that are located closest to the front of the unit.
3. Using the removed screws, screw the rack mounting bracket into the unit.
4. Repeat the procedure on the opposite side of the unit.

1

Front of unit

Rear of unit

2

3

4
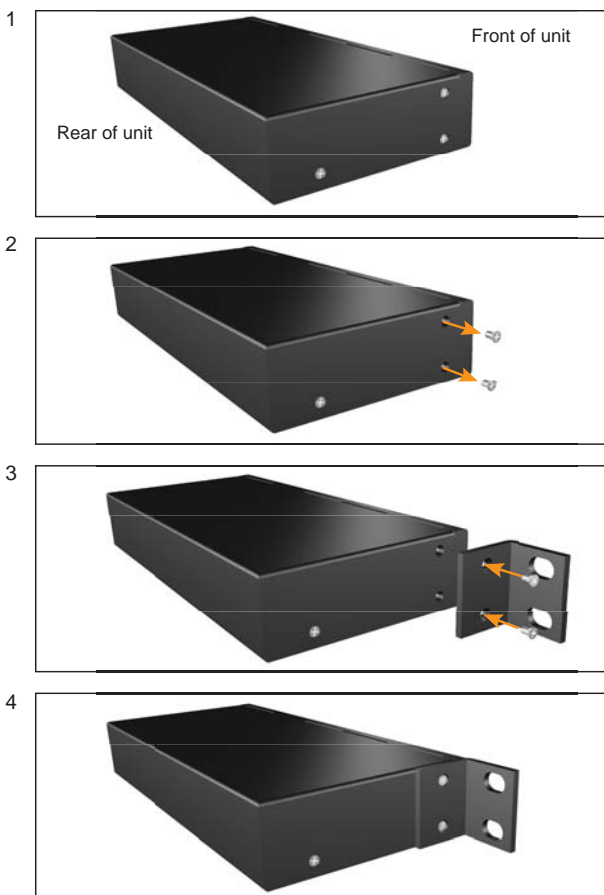
SPECIFICATIONS

Video Amplifier Bandwidth .... 1.65 Gbps

Input Video Signal .... 1.2 volts p-p

Input DDC Signal .... 5 volts p-p (TTL)

Single Link Range ....1080p / 1920 x 1200

HDMI Input/Output Connector .... Type A 19-pin Female

Remote Control Port .... RS-232 Female, Mini-Stereo

Power Consumption .... 60 watts (max)

Power Supply .... 24V DC

Dimensions .... 17" W x 1.75" H x 5.875" D

Shipping Weight .... 10 lbs.

TERMINOLOGY

DDC
Short form for Display Data Channel. It is a VESA standard for communication between a monitor and a video adapter. Using DDC, a monitor can inform the video card about its properties, such as maximum resolution and color depth. The video card can then use this information to ensure that the user is presented with valid options for configuring the display.

DDWG
Digital Display Working Group DDWG are the creators of the DVI specification.

DVI
Digital Visual Interface. Connection standard developed by Intel for connecting computers to digital monitors such as flat panels and DLP projectors. A consumer electronics version, not necessarily compatible with the PC version, is used as a connection standard for HDTV tuners and displays. Transmits an uncompressed digital signal to the display. The latter version uses HDCP copy protection to prevent unauthorized copying.

HDCP
High-Bandwidth Digital Content Protection. Created by Intel, HDCP is used with HDTV signals over DVI and HDMI connections and on D-Theater D-VHS recordings to prevent unauthorized duplication of copy written material.

HDMI
The High-Definition Multi-media Interface (HDMI) is an industry-supported, uncompressed, all-digital audio/video interface. HDMI provides an interface between any compatible digital audio/video source, such as a set-top box, DVD player, and A/V receiver and a compatible digital audio and/or video monitor, such as a digital television (DTV).

HDTV
High-Definition Television. The high-resolution subset of our DTV system. The ATSC defines HDTV as a 16:9 image with twice the horizontal and vertical resolution of our existing system, accompanied by 5.1 channels of Dolby Digital audio. The CEA defines HDTV as an image with 720 progressive or 1080 interlaced active (top to bottom) scan lines. 1280:720p and 1920:1080i are typically accepted as high-definition scan rates.

RS-232
Recommended Standard 232. This is the de facto standard for communication through PC serial ports. It can refer to cables and ports that support the RS232 standard.

VESA
Video Electronic Standards Association, a consortium of manufacturers formed to establish and maintain industry wide standards for video cards and monitors. VESA was instrumental in the introduction of the Super VGA and Extended VGA video graphics standards with a refresh rate of 70 Hz, minimizing flicker and helping to reduce user eyestrain and fatigue.